

ABSTRACT OF DISCLOSURE

Disclosed are super broadband circularly polarizing film materials and novel methods of fabricating and using the same. The circularly polarizing materials are made from a film of material, such as a CLC polymer having a cholesteric order, in which a liquid crystal material, such as a nematic liquid crystal material, is distributed in a non-linear fashion across the thickness of the film in a plurality of liquid crystal-rich and liquid crystal-depleted sites in the CLC polymer. The pitch of the helices of the CLC molecules in the polyermized CLC material varies in a non-linear (e.g. exponential) manner along the depth dimension (i.e. transverse to the surface) thereof. The resulting circularly polarizing materials have reflection and transmission characteristics over bands of operation approaching 2000nm. Depending on the final spiral structure of the materials utilized, the CLC circularly polarizing materials reflect either left-handed or right-handed circularly polarized light.